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Jared L. Zerbe

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EXAMINER

JAMAL, ALEXANDER

ART UNIT

PAPER NUMBER

2614

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 09/993,138	<b>Applicant(s)</b> ZERBE, JARED L.	
	<b>Examiner</b> ALEXANDER JAMAL	<b>Art Unit</b> 2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 October 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Response to Amendment***

1. The examiner notes that, as per the RCE filed 10-8-2008, claims 21-31 are cancelled and arguments submitted.
2. Based upon the submitted amendment, the examiner notes that claims 1-3,5,7,8,12,13,15,17,18,19,32,40,41 have been amended and claims 44,45 have been added.
3. The examiner maintains one of the previously sets of rejections Schelkunoff [US 2,038,240] in view of Franaszek et al [US 4,486,739]., and submits a new set of non-final rejections.

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. **Claims 1-45** rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. The claims refer to segments which define portions of traces that are ordered specifically. It is not clear exactly where the segment boundaries would lie. The examiner notes that in applicant's figures there are any number of points where the end of one segment could lie, and still have a set of traces in 1 order. It is not clear exactly what defines the beginning and end point of a segment. For the purpose of examination, the examiner assumes the claims refer to the

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fact that traces may 'criss-cross' each other on different layers of a PCB in order to reduce crosstalk.

4. The examiner additionally notes that there are indeterminate points (where the signals cross) where the order of the signals is not in a known order because two signal lines are at the same point (as in applicant's fig. 3).

5. The following items are not clearly defined in applicant's specification. Since applicant's specification give no concrete examples or values for the claimed crosstalk reduction, the following are not clear:

In claim 2,3,5, the relative 'function' or ratio of the disclosed terms to an 'interline coupling parameter' is not clear.

In claim 4,5, 'approximately equal' is not clear

In claim 7, it is not clear how 'different segment lengths' will reduce the crosstalk, further it is not clear by how much they will reduce the crosstalk.. the claim is making a generalization that crosstalk decreases with distance !

The examiner contends that the same claim elements used in the remaining claims are also unclear. Applicant's specification does not disclose any real world examples or values from which to determine the unclear terms/phrases.

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6. The examiner additionally notes that applicant's claims do not recite any specific logic or steps (as enabled by the specification) in how the traces' relative positions cancel or reduce any crosstalk, other than a broadly claimed 'interline coupling parameter' that is inherent to the concept of 'crosstalk' (the factor that indicates the percentage of signal that is parasitically coupled from one wire/trace to another. The examiner contends it is very well known to reduce crosstalk as crosstalk defines an unwanted signal.

Correction/clarification is requested.

#### **Claim Rejections - 35 USC § 103**

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-45** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mellon (6058256) And further in view of Franaszek et al [US 4,486,739].

Regarding **claim 1**, Mellon teaches a method and means of rerouting signals specifically to reduce desired crosstalk. Mellon discloses that the crosstalk (which inherently comprises the 'interline coupling factor') can be calculated and traces rerouted to reduce the crosstalk to a desired level for desired traces (ABSTRACT). Additionally, Mellon discloses that traces may be routed on different layers. As such they may be 'criss-crossed' with other traces by using the separate layers. However, Mellon does not teach expressly using encoding a digital signal for transmission.

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Franaszek et al teach an encoder circuit for encoding a digital signal [Figs. 1-13; col. 4, line 30 to col. 6, line 36]. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teachings of Franaszek et al with Mellon in order to incorporate encoded digital signals so that the data throughput of a communication system is increased [Franaszek et al; col. 1, lines 7-22].

Furthermore, the examiner contends that one of ordinary skill in the art would know to experiment and arrange the segments so to minimize crosstalk. It is obvious to vary the positions of the traces so to minimize crosstalk.

Regarding **claim 2**, Mellon further teaches the method, wherein the interline coupling of a particular pair of signal lines is represented as a function of the distances between the particular pair of signal lines over all the segments (Fig. 3).

Furthermore, the examiner notes that applicant has not clearly defined what a 'segment' would be.

Regarding **claim 3**, The 'interline coupling' (crosstalk) of a particular pair of signal lines is inherently able to be represented as a function of a summation of the distances between the particular pair of signal lines over all the segments, [Fig. 2].

Regarding **claim 4**, the examiner notes that any group of traces may arbitrarily be divided up into segments and those segments may be of different (or approximately equal) lengths [fig. 3].

Regarding **claims 5-7,11**, the limitations are shown above.

As per **claim 10**, the traces are on a 'planar substrate' (layer).

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As per **claims 2-3,15,18-20,27,29-37,42-45**, the examiner contends that the interline couplings inherently are represented by the elements. The interline coupling inherently are represented by the distance between lines, the summation of distances, and any 'coupling parameters' are inherently varied when routing the traces to avoid crosstalk.

Regarding claims **8-45**, they are inherent variations of the method claims 1-7. Therefore claims 8-43 are interpreted and thus rejected for the reasons stated above in claims 1-7.

As per **claims 1-45**, the examiner contends it would have been obvious to manipulate various wire positions (as done by both mellon) in terms of the interwire crosstalk (crosscoupling) as that is the primary term which all the prior art is set to minimize. The examiner further contends it would have been obvious to use experimentation to arrange the traces according to the specific signaling being used in order to reduce the crosstalk. This would include all variations in segment length and wire order within each segment. The examiner contends that any conceivable combination of trace order and segments could be used when experimenting to find the optimum trace routing for crosstalk performance.

#### **Previous Rejection maintained**

3. **Claims 1-45** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schelkunoff [US 2,038,240] in view of Franaszek et al [US 4,486,739].

Regarding **claim 1**, Schelkunoff teaches a method comprising: communicating the signal over a plurality of segments of at least two signal lines [Fig. 2; col. 3, lines 51-58]; and transposing the signal lines between the segments of signal lines in a manner that reduces differences in interline couplings between a given signal line and another signal line [Fig. 2; col. 3, lines 38-72; claim 5].

Schelkunoff et al do not teach expressly using encoding a digital signal for transmission.

Franaszek et al teach an encoder circuit for encoding a digital signal [Figs. 1-13; col. 4, line 30 to col. 6, line 36].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the teachings of Franaszek et al with Schelkunoff in order to incorporate encoded digital signals so that the data throughput of a communication system is increased [Franaszek et al; col. 1, lines 7-22]. Further, although Schelkunoff teaches reducing cross-talk between a plurality of coaxial conductor lines using a pair of lines as an illustration [Fig. 2; col. 3, lines 39-57], it is within the level of ordinary skill to apply the method to reduce interline couplings between a given signal line and any number of remaining conductor lines including at least four signal lines and specifically disclosing a specific set of four signal lines with alternating segment positions.

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Furthermore, the examiner contends that one of ordinary skill in the art would know to experiment and arrange the segments so to minimize crosstalk. It is obvious to vary the positions of the traces so to minimize crosstalk, or to have one interpair crosstalk to cancel another interpair crosstalk in order to minimize crosstalk for a particular application.

Regarding **claim 2**, Schelkunoff further teaches the method, wherein the interline coupling of a particular pair of signal lines is represented as a function of the distances between the particular pair of signal lines over all the segments [col. 4, 45-50].

Regarding **claim 3**, Schelkunoff further teaches the method, wherein the interline coupling of a particular pair of signal lines is represented as a function of a summation of the distances between the particular pair of signal lines over all the segments, wherein the summation of distances is not shown [Fig. 2].

Regarding **claim 4**, Schelkunoff further teaches the method, wherein, in general, the segments may be of different (or approximately equal ) lengths [ Col. 3, lines 45-50].

Regarding **claims 5-7**, the limitations are shown above.

As per **claims 2-3,15,18-20,27,29-37,42-45**, the examiner contends that the interline couplings inherently are represented by the elements. The interline coupling inherently are represented by the distance between lines, the summation of distances, and any 'coupling parameters' are inherently varied when routing the traces to avoid crosstalk.

Regarding claims 8-45, they are inherent variations of the method claims 1-7. Therefore claims 8-43 are interpreted and thus rejected for the reasons stated above in claims 1-7.

As per **claims 4-41**, the examiner contends it would have been obvious to manipulate various wire positions (as done by both Schelkunoff and Alexander) in terms of the interwire crosstalk (crosscoupling) as that is the primary term which all the prior art is set to minimize. The examiner further contends it would have been obvious to use experimentation to arrange the traces according to the specific signaling being used in order to reduce the crosstalk. This would include all variations in segment length and wire order within each segment. The examiner contends that any conceivable combination of trace order and segments could be used when experimenting to find the optimum trace routing for crosstalk performance.

### Response to Arguments

4. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

The examiner additionally notes that the entire concept of positioning wires to avoid/cancel has been used for a very long time. The entire concept of twisted wired pairs is to physically position the wires to avoid or reduce interference. Examiner contends it would have been obvious to apply those basic concepts to any situation where information is being transferred over conductive (radiating) media.

### Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(i) Nyquist [US 2,070,744] teaches crosstalk reduction in communication systems [Whole document]; and

(ii) Balde [US 3,764,727] teaches transposing each wire in the pair [Figs. 1-15; col. 1, lines 19-38].

(iii) Hinderks [US 6,700,958 B2] teach a method for transmitting coded digital signals through a transmission channel [Figs. 1, 12-13, 16-17; Abstract].

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The examiner further notes prior art patent to Hashim et al. (6464541) which also teaches the concepts of positioning conductive lines to minimize crosstalk.

### **Response to Arguments**

1. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 571-272-7498. The examiner can normally be reached on M-F 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 571-272-7499. The fax phone numbers for the organization where this application or proceeding is assigned are **571-273-8300** for regular communications and **571-273-8300** for After Final communications.

/Alexander Jamal/

Primary Examiner, Art Unit 2614

Examiner Alexander Jamal

December 31, 2008